Audio-visual fit-out within JCU facilities is generally within two distinct areas –

installation. The AV Contractor shall not be a general Electrical contractor only. The AV Contractor shall be able to demonstrate that the company has been engaged in AV system installation for a substantial period and has completed projects of a similar size and scope.

It is a mandatory requirement that the contractor shall be an authorised dealer for the major lines of equipment to be supplied.

The contractor must provide evidence that their staff:

- hold a current ACMA licence for the installation of communication cabling
- hold suitable and approved industry qualifications (such as the CTSe 4.1(h5.9((.9(h)7)-0.8(d)29((a)-5(

In addition to the AV designer, the institution's AV Services staff should be involved in briefings during the project definition/development phase. AVS should be advised in writing of the proposed:

Where PCs are specified in designs the interface to the AV system should typically provide for HDMI connection and line audio.

Laptop interfaces should support VGA with line audio and HDMI.

Designers should consult staff from JCU IT Services and Support with regards to the make and model of computers that will be supplied, currently the latest model Dell and Apple computers.

Projection facilities in teaching rooms must be designed to comply with the size and viewing angle requirements described in the current edition of the AETM *Audiovisual Guidelines for Tertiary Teaching Spaces.* The minimum specifications (rules) from the AETM Guidelines are as set out below. (See also the Section in this document on *Teaching Spaces*). To remain in compliance with the JCU design guidelines, no more than 10% of the seats in any teaching space may fall outside any rule.

The acceptable area for audience placement in front of a screen is determined by:

- the horizontal and vertical angle of view
- the distance to the display for the furthest viewers
- clear sightlines to both the projected image and the presenter for all viewers

In general classrooms, the height of the projection screen or flat panel display shall be no less than the distance from the centre of the screen to furthest audience member divided by 6. In specialist instructional spaces a more stringent standard may apply and the height of the projection screen or flat panel display shall be no l634.1.217 Td [(s)-4.3(c)6(r.011 TT)-6(r)-2.8(a22.8(a22.8(a22.8(a225
-16.99.--0.7(t(o)1.2(n)-0.,)66(w.9(an)(b)-0.7(-20.5(f)-3.3r)-2.8(a22.8(a221)-6(n).3(p-4 3.3(l9.3(e)-Td [(s)-4.3((e)-6(7(b)-0.7(

The recommended aspect ratio for classroom displays is widescreen format. In circumstances where projection alone is used for display, the 16:10 aspect ratio provides an optimum display for PC based instruction. Where a mixture of large screen monitors and projection is used, a 16:9 aspect ratio is recommended for projection screens to avoid distortion of one format or the other.

These guidelines for viewing are reproduced for con9(i)-119e-27.17n9ect rnl f Tcerrlaetnb-0.8(l)-14.1(a)-6. at

d) All theatre lighting (except exit and stair tread lights) must be remotely controllable from the Theatre Control Systems installed as part of the audio visual fit-out. This can be achieved with contactor switching of lighting circuits and digitally controlled dimmers.

e) Lighting systems must not cause interference to any other audio visual equipment in the theatre. This includes infra-red (IR), acoustic and electrical interference.

Lighting shall be arranged in zones from front to rear. In a larger theatre (typically gd ( )Tj8.9(yD 5 >>BDC J 0 Tc 0

Bio-box lighting shall include switchable work lights and manually dimmable ambient lights over working areas.

A telephone shall be provided (restricted to internal calls).

At least 2 network connections shall be provided.

Where required by the standards outlined in A4.1.4.1 above or where specifically briefed, a purpose designed audio system should be installed to provide the following functionality:

- Voice reinforcement (Public Address)
- High fidelity replay of program sources
- Assistive listening / hearing augmentation
- Recording (where required)

Audio system components will, as a minimum, comprise:

- One or more high quality speakers installed so as to provide uniform sound coverage over the listener area;
- Lectern microphone and provision for additional microphones to be connected;
- Radio microphone (where specified);
- Digital signal processing audio mixer to enable signal routing, level control, limiting/compression and equalisation of signals from microphones and line level audio replay equipment. The audio mixer will provide phantom power to microphones, interface to the lecture theatre control system and provide sufficient outputs for power amplifiers and recording devices;
- High quality audio power amplifiers with overload protection;
- Fit for purpose Infrared assistive hearing technology

Large (>150 seats) or special purpose venues will have additional requirements, particular where the venue is used for cinema studies, remote

The uniformity of audio coverage shall be determined by measurement and validation standard ANSI/INFOCOMM 10-2009: Audio Coverage Uniformity in Enclosed Listener Areas to “ensure that every listener perceives approximately the same direct sound from the sound system, no matter where the listener is positioned within the specified listening area of the sound system”.

A combination of FOH and distributed speakers should be considered for medium to large venues to ensure all areas receive voice reinforcement which is direct, uniform in level and has high intelligibility. Electronic delay and speaker zoning should be considered where the delay between the sound arriving at the listener from the primary source and distributed speakers interact to significantly affect the intelligibility (STI) or spatial image of the sound source.

Audio equipment chain performance should meet the specifications outlines in the relevant section of the AETM Audio Visual Design Guidelines.

Emergency evacuations systems may require room sound systems to be muted in the event of an alarm. Advice should be sought from a Fire/Electrical Engineer as to what is required of the sound system in relation to -9.3(e)-6(r)-2.8((e)-6(m)-3.3(u)-3.2(i)-14.2d)-2-0.7(e)-6(e)-6(0)-9.3(e)-6(e)]TJ ir(r)-2.8(c)
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lighting. Full manual override should also be available, should the user wish to alter the pre-programmed lighting for example.

All touch screen designs should conform to University standards to maximise usability and minimise the need for specific user training.

In any project involving the installation of AV facilities, the contractor will be responsible for installing cables as specified by VAVS or the AV consultant

Where termination is not to occur immediately, the contractor must leave 4 metre tails on cables terminating at the FOH equipment bench and any equipment racks; and 2 metre tails elsewhere. Excessive length of tails is to be avoided. If pre-terminated cables are used, any excess length shall be pulled back into a suitable void.

The contractor must label all cables at both ends with a meaningful identification using an adhesive labeling system. The label shall include the cable number shown on the drawing and identify the source (including port or output number) and destination (with port or input number) of the cable.

AV cables shall be secured using only Velcro cable ties. Nylon “zip ties” are not to be used.

Cabling should be concealed and run within wall and ceiling spaces wherever access to these spaces is possible. Where cabling must run on the surface of a wall or ceiling, JCU approved ducting

In the case of Tiered Theatres, a minimum of two 50mm spare conduits shall be installed to provide capacity to install additional cables from the teaching station to the Bio-box in the future.

All signal and power cables within equipment racks shall be secured vertically (by means of cable trays built into the rack structure) and horizontally (using lacing bars).
Lacing bars shall be fitted at the rear of racks in all circumstances where four or more cables are to be connected.

When cables are loomed and bundled before being terminated, sufficient length shall be allowed so that connectors are not under strain when attached to the equipment. All dressing of cables must allow for appropriate bend radii so that cable performance is not degraded and shields are not damaged

Where access is not

Word	Short - form Definition
AETM	Association of Educational Technology Managers (www.aetm.org) – an Australian Tertiary Education organization responsible for AV standards and guidelines

	communicate with each other as long as they all comply with the standard. H.320 references many other standards for specific tasks (such as audio coding or video coding). This is also a top-level standard, like H.320, for videoconference systems. The

	data exchange.
	A communications network that services a geographic area larger than that served by a local area network or metropolitan area network. WANs include commercial or educational networks such as AARNet, Janet, and others.
AETM	Association of Educational Technology Managers (www.aetm.org) – an Australian Tertiary Education organization responsible for AV standards and guidelines
ANSI	The American National Standards Institute – a standards organisation.
Data Projector	An electronic device capable of projecting an image from a computer or video source onto a large display screen. (the terms 'data projector' and 'video projector' are normally interchangeable
AMX	A control system used by most universities which is manufactured by AMX C
VAVS	Videoconferencing & Audio Visual Services. This section is a unit within JCU V